

PRACTICE AND APPLICATIONS

STUDENT HELP

► **Extra Practice**
to help you master
skills is on p. 797.

EVALUATING VARIABLE EXPRESSIONS Evaluate the expression for the given value of the variable.

13. $3 + 2x^3$ when $x = 2$ **19**

15. $6 \cdot 2p^2$ when $p = 5$ **300**

17. $13 + 3b$ when $b = 7$ **34**

19. $\frac{x}{7} + 16$ when $x = 14$ **18**

21. $\frac{4}{5} \div n + 13$ when $n = \frac{1}{5}$ **17**

14. $y^4 \div 8$ when $y = 4$ **32**

16. $t^5 - 10t$ when $t = 3$ **213**

18. $3r^2 - 17$ when $r = 6$ **91**

20. $27 - \frac{24}{b}$ when $b = 8$ **24**

22. $\frac{9}{10} \cdot y - \frac{3}{10}$ when $y = \frac{1}{2}$ **$\frac{3}{20}$**

EVALUATING NUMERICAL EXPRESSIONS Evaluate the expression.

23. $4 + 9 - 1$ **12**

24. $3 \cdot 2 + \frac{5}{9}$ **$6\frac{5}{9}$**

25. $6 \div 3 + 2 \cdot 7$ **16**

26. $5 + 8 \cdot 2 - 4$ **17**

27. $16 \div 8 \cdot 2^2$ **8**

28. $2 \cdot 3^2 \div 7$ **$2\frac{4}{7}$**

29. $10 \div (3 + 2) + 9$ **11**

30. $7[(18 - 6) - 6]$ **42**

31. $[(7 - 4)^2 + 3] + 15$ **27**

32. $3(2.7 \div 0.9) - 5$ **4**

33. $6(5 - 3)^2 + 3$ **27**

34. $[10 + (5^2 \cdot 2)] \div 6$ **10**

35. $\frac{1}{3}(9 \cdot 3) + 18$ **27**

36. $\frac{1}{2} \cdot 26 - 3^2$ **4**

37. $2.5 \cdot 0.5^2 \div 5$ **0.125**

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HOMEWORK HELP

Example 1: Exs. 13–22

Example 2: Exs. 23–37

Example 3: Exs. 38–40,
42

Example 4: Exs. 43–46

Example 5: Ex. 41

EXPRESSIONS WITH FRACTION BARS Evaluate the expression.

$$38. \frac{9 \cdot 2}{4 + 3^2 - 1}$$

$$39. \frac{13 - 4}{18 - 4^2 + 1}$$

$$40. \frac{5^3 \cdot 2}{1 + 6^2 - 8}$$

41. **Writing** You decide to buy two rings from an outdoor vendor. One ring costs \$10.89. The other ring costs \$12.48. The sales tax is 8%. The vendor uses a calculator to obtain the price including sales tax for both rings and gets \$24.37. What mistake did the vendor make? **The vendor taxed only the \$12.48 ring instead of taxing both rings.**

42. **LOGICAL REASONING** Which is correct? Explain.

A. $\frac{(9 - 7)^2 + 3}{5} = (9 - 7)^2 + 3 \div 5$

B. $\frac{(9 - 7)^2 + 3}{5} = [(9 - 7)^2 + 3] \div 5$



ORDER OF OPERATIONS In Exercises 43–46, two calculators were used to evaluate the expression. They gave different results. Which calculator used the established order of operations? Rewrite the calculator steps with grouping symbols so that both calculators give the correct result.

43. 15 \div 6 \div 3 \times 4 **ENTER**

Calculator A: 12; Calculator B: 7

Calculator B; $15 - (6 \div 3 \times 4)$

44. 15 \div 9 \div 3 $+$ 7 **ENTER**

Calculator A: 19; Calculator B: 9

Calculator A; $15 - (9 \div 3) + 7$

45. 15 $+$ 10 \div 5 $+$ 4 **ENTER**

Calculator A: 21; Calculator B: 9

Calculator A; $15 + (10 \div 5) + 4$

46. 4 \times 3 $+$ 6 \div 2 **ENTER**

Calculator A: 9; Calculator B: 15

Calculator B; $(4 \times 3) + (6 \div 2)$

47. **HOTEL RATES** A hotel charges \$49.99 per room per night for adults and \$44.10 per room per night for senior citizens. The expression $2 \times \$49.99 + 3 \times \44.10 represents the total cost of five rooms for two adults and three senior citizens for an overnight stay. Where in the expression can you put grouping symbols to make sure it is evaluated correctly?

$(2 \times \$49.99) + (3 \times \$44.10)$



FOOTBALL UNIFORMS In Exercises 48 and 49, use the following information.

The table shows the cost of parts of a professional football player's uniform.

A sporting goods company offers a \$3200 discount for orders of 30 or more complete professional football player uniforms.

48. **$35(\$230 + \$300 + \$50 + \$25 + \$100 + \$200) - \$3200$**

48. Write an expression that represents the cost for an order of 35 complete professional football player uniforms.

49. Evaluate the expression you wrote in Exercise 48.

\$28,475

42. B; the brackets represent the grouping symbol indicated in the original equation by the fraction bar.

55c. \$3.35; one method is to determine the original price, \$25.50, and subtract the discounts to get the sale price of \$21.65, then subtract that amount from \$25. Another method is to calculate the difference between \$25 and the sale price directly: $\$25 - ((0.9)(5)(\$2.50) + (0.8)(10)(\$1.30)) = \3.35 .

 **ADMISSION PRICES** In Exercises 50 and 51, use the table below. It shows the admission prices for the California State Fair in 1998. Suppose a family of 2 adults, 1 senior, and 3 children go to the State Fair. The children's ages are 13 years, 10 years, and 18 months.

50. Write an expression that represents the admission price for the family.

$$3(\$7) + \$5 + \$4$$

51. Evaluate the expression you wrote in Exercise 50.

$$\$30$$

California State Fair Admission Prices	
Age	Admission price
General Admission (13–61 years of age)	\$7.00
Seniors (62 years and above)	\$5.00
Children (5–12 years)	\$4.00
Children (4 years and under)	Free

► Source: *Sacramento Bee*

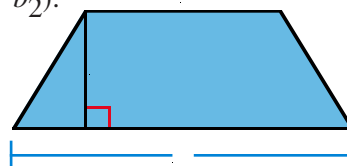
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Study Tip

The expression $b_1 + b_2$ is read “ b sub 1 plus b sub 2”.

52. **GEOMETRY CONNECTION** The area A of a trapezoid with parallel bases of lengths b_1 and b_2 and height h is $A = \frac{1}{2}h(b_1 + b_2)$.

Find the area of a trapezoid whose height is 2 meters and whose bases are 6 meters and 10 meters. 16 m^2



GEOMETRY CONNECTION In Exercises 53 and 54, use the following information. The surface area of a cylinder equals the lateral surface area ($2\pi r \cdot h$) plus the area of the two bases ($2 \cdot \pi r^2$).

53. Write the expression for the surface area of a cylinder. $2\pi rh + 2\pi r^2$ or $2\pi r(h + r)$

54. Evaluate the expression when $h = 10.5$ centimeters and $r = 2.5$ centimeters.

Use 3.14 as an approximation for π . 204.1 cm^2

55. **MULTI-STEP PROBLEM** You are shopping for school supplies. A store is offering a 10% discount on binders and a 20% discount on packages of paper. You want to buy 5 binders originally marked \$2.50 each and 10 packages of paper originally marked \$1.30 each.

a. Write an expression that shows how much you will save after the discounts.

$$0.1(5)(\$2.50) + 0.2(10)(\$1.30)$$

b. Evaluate the expression. $\$3.85$

c. *Writing* If you have \$25 to spend on supplies, how much money will you have left over? Explain how you arrived at your answer. **See margin.**

56. **CRITICAL THINKING** Without grouping symbols, the expression $2 \cdot 3^3 + 4$ has a value of 58. Insert grouping symbols in the expression $2 \cdot 3^3 + 4$ to produce the indicated values.

a. 62 $2(3^3 + 4)$ b. 220 $(2 \cdot 3)^3 + 4$ c. 4374 $2 \cdot 3^3 +$ d. 279,936 $(2 \cdot 3)^3 +$

57. Create a math puzzle like the one in Exercise 56 with an expression that produces different values when grouping symbols are inserted in different places. **Check puzzles.**

Test Preparation

★ Challenge

EXTRA CHALLENGE

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